

Modified Radical Mastectomy

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IN THE SURGICAL treatment of cancer of the breast, the classical radical mastectomy based on the principles established by Halsted,¹² Meyer,²⁰ and Handley (W. S.)¹⁴ is generally considered the preferred method. However, Patey^{23, 24} suggested that equally satisfactory results were obtained if the pectoralis major muscle was preserved. Similar observations were subsequently made by Handley (R. S.)¹³ following the use of the Patey operation. Also Crile⁵ and Auchincloss¹ each have emphasized a conservative surgical approach.

In the present study an analysis is made of the results obtained in the treatment of cancer of the breast by a modified radical operation in which a total mastectomy and complete axillary dissection are done with preservation of both the pectoralis major and minor muscles. The technic for the performance of this operation has been described in detail in a previous publication.¹⁸

Historical Considerations

The modified radical mastectomy is not a new operation. Moore²¹ described it well over 100 years ago (1867). In fact, the description of the operative procedures of his day are currently of interest in our own. "Sometimes the tumor only is removed; sometimes the segment of the breast (where

the tumor lies) is taken away . . . ; sometimes . . . the entire mamma." However, he emphasized that: "Mammary cancer requires the careful extirpation of the entire organ."

The tenets proposed by Moore for the removal of the breasts are equally acceptable today. "In the performance of the operation it is desirable to avoid, not only cutting into the tumor, but also seeing it." It was further stated: "Diseased axillary glands should be taken away by the same dissection as the breast itself, without dividing the intervening lymphatics." Accordingly, Moore performed axillary dissection selectively rather than as a routine procedure. It is of interest to observe that this surgical principle, established so long ago, is the same as currently advocated by Crile.⁵

Volkmann²⁷ (1895), followed the dictates of Moore and was opposed to the performance of a partial amputation. Instead he advised total removal of the breast regardless of how small the primary tumor might be. The pectoralis major muscle was preserved as the "floor"; however, the necessity for excision of the pectoralis fascia was stressed. Also, where the axillary lymph nodes were "diseased," they were removed. This was referred to as a "cleaning of the axilla." However, if the supraclavicular nodes were invaded, operation was not advised. Clinical data were given on 26 patients operated upon between September 1871 and November 1873. In 5 (19.2%) a total mastectomy alone was performed and in each of the remaining 21 (80.8%) pa-

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tients a total mastectomy was combined with an axillary node dissection. In seven (26.9%) of the 26 patients the Lister antiseptic technic was used.

Gross¹⁰ (1880) in the United States, like Volkmann in Germany, was a staunch supporter of the concepts expressed by Moore. He advised the removal of: ". . . the entire breast and its coverings by a circular incision . . . dissect off the fascia of the pectoralis muscle and prolong the outer portion of the incision into the axilla with a view to its thorough exploration." If there were secondary tumors in the axilla, Gross stated: ". . . the axillary space must be thoroughly cleaned out. . . ." Total mastectomy and concomitant "cleaning out" of the axilla was performed in 19 (39.8%) of 48 patients treated for mammary cancer. All wounds were left open to heal by secondary intention.

Banks² (1882) of England reported the use of the modified radical mastectomy in 46 patients. Relative to dissection of the axilla he stated: "As you cannot tell whether these glands are infected or not, remove them and dissipate the doubt." Again, he stated: ". . . even the highest ones (axillary nodes) can readily be brought down from the very top of the cavity. . . ." In no instance had he ". . . yet found occasion for dividing the pectoral muscles. . . ."

Sprengel²⁵ (1882) reported the results of the operations performed for breast cancer in 131 patients that were treated in the Volkmann Clinic during the period between 1874 and 1878. Again the importance of always removing the whole breast was stressed. When the axillary nodes were affected, the axilla was "cleaned out" (clinical staging). If on clinical examination the axillary nodes were not palpable, then at the time of operation, ". . . the axilla was opened in order to ascertain the true diagnosis" (operative staging). In the 131 patients treated, a total mastectomy alone was done in 29 (14.5%) and in the remaining 102 (77.8%) patients a complementary

axillary node dissection was performed (modified radical).

Küster,¹⁷ in 1883, is believed the first to emphasize the importance of routine dissection of the axillary nodes in conjunction with total mastectomy in the treatment of breast cancer. This was advised even though ". . . the axilla still appears to be healthy." In 132 patients with cancer of the breast, 117 (89.1%) were so treated. This series was begun in May 1871 and continued to December of 1882. Accordingly, the initiation of this study preceded that of Volkmann²⁷ by 4 months, but differed in that Küster performed a complementary axillary dissection routinely whereas Volkmann did the same only when the nodes were palpable. In the discussion of Küster's presentation,¹⁷ Gussenbauer, von Langenbeck, and von Winiwater were each in agreement that a routine axillary dissection should be done in all patients regardless of the presence or absence of palpable nodes. However, Gussenbauer also advised: ". . . an extirpation of the supraclavicular nodes . . . when the condition demanded it."

In 1894, Halsted¹² and later in the same year, Meyer,²⁰ reported their individual technics for the surgical treatment of cancer of the breast. Initially Halsted removed only the pectoralis major muscle concomitant with axillary node dissection. The pectoralis minor muscle was transected for technical expediency in doing the dissection of the axilla and then resutured. Subsequently he was in complete conformity with the concept of Meyer that both muscles should be removed routinely. This principle rapidly became the universally accepted standard for the operative treatment of cancer of the breast; and remained so until the recent interest in the re-discovery of the varied conservative methods of surgical management.

Murphy,²² in 1912, said that he had abandoned the operation of Halsted for cancer of the breast and instead followed the practice of not removing the pectoral muscles.

TABLE 1. *Modified Radical Mastectomy—
1958–1968; 94 Patients—
Age* and Sex Incidence*

Years	Men	Women	Total
20–29	0	0	0
30–39		2	2
40–49	0	19	19
50–59	0	26	91 26
60–69	0	25	(96.8%) 25
70–79	1	20	21
80–89	0	1	1
Total	1	93	94

* Age: Youngest 30 yr.; Oldest 85 yr; Aver. Age: 59.5 yr.

This practice was based on what was stated as the original report by Bryant of London, “. . . who had seen but one case of recurrent carcinoma in the pectoral muscles in an experience extending over forty years.” Subsequently, Grace⁹ (1937) advocated total mastectomy alone but this recommendation lay fallow until the report of McWhirter¹⁹ which stimulated a widespread renewal of interest in this procedure.

Subsequent to Patey,²³ it was Holman,¹⁶ also of England whose experience supported the concept of Murphy that little is gained by routine sacrifice of the pectoral muscles. He stated: “For many years, in nearly all Stage-I cases and in an increasing proportion of Stage-II cases, I have practiced an operation which removes the breast . . . together with the axillary glands but preserves the pectoral muscles.” Between the years 1930 and 1942 there were 53 Stage-I and 106 Stage-II patients who were so treated with an 83 per cent and 42 per cent 5-year survival rate, respectively.

A review of the preceding serves to confirm the Biblical quotation: “. . . there is nothing new under the sun.” It is apparent that all of the “new” present day concepts relative to the surgical management of breast cancer were in popular vogue a century and more ago.

Clinical Study

During the 10-year period, from December, 1958 to December, 1968, the modified radical mastectomy, with preservation of both pectoral muscles, was performed in a consecutive and unselected series of 94 patients. All except one of the patients were women. The youngest patient was 30 and the oldest 85 years of age. The average age was 59.5 years. Two (2.1%) patients were in the fourth decade and 1 (1.1%) in the ninth. The remaining 91 (96.8%) were almost equally distributed throughout the fifth, sixth, seventh, and eighth decades (Table 1).

Seventy-five (79.7%) of the patients, or approximately four of every five patients, were without symptoms. In the 19 (20.3%) patients with symptoms, pain was the complaint in 14 (73.7%) and in the remaining five (26.3%) patients it was a nipple discharge. A self diagnosis was made by 54 (72.0%) of the 75 patients without symptoms. Therefore, in only about one of every four patients was the diagnosis made by a physician.

In 48 (51.1%) patients the tumor was in the right breast and in the remaining 46 (48.9%) it was in the left breast. The location of the tumor was in the lateral or outer half of the breast in 62 (66.6%) patients, the central area in 16 (17.2%), and the inner or medial half in 16 (17.2%) patients (Table 2). In 53 (56.3%) patients the tumor was 3 cm. or less in diameter and in the remaining 41 (43.7%) patients it was in excess of 3 cm.

In the 62 patients with lesions located in the lateral half of the breast, 32 (51.6%) had metastases to the axillary nodes. Three (18.7%) of the 16 patients with lesions in the medial half of the breast and 10 (33.3%) of the 15 patients with central lesions had “positive” axillary nodes. In the total of 93 patients available for study, approximately one of every two had axillary nodal metastases (Table 2).

TABLE 2. *Modified Radical Mastectomy—1958–1968; 3 Yr.–13 Yr. Follow-up—Prognosis in Relation to Location of Tumor*

Location in Breast	No.	Study	Axillary Nodes		Alive and Well	Alive with Disease	Died of Disease	Died of Other Causes
			Pos.	Neg.				
Medial half	16	16 (17.2%)	3	13	10 (62.6%)	0 (0.0%)	3 (18.7%)	2 (18.7%)
Lateral half	62	62 (66.6%)	32	30	28 (45.2%)	2 (3.2%)	24 (38.7%)	8 (12.9%)
Central	16	15 (16.2%)	10	5	6 (40.0%)	0 (0.0%)	5 (33.3%)	4 (26.7%)
	94	93 (98.9%)	45 (48.4%)	48 (51.6%)	44 (47.4%)	2 (2.1%)	32 (34.4%)	15 (16.1%)

In 34 (36.2%) patients the axillary nodes were palpable, and in 28 (82.4%) metastases were present. In the remaining 60 (68.8%) patients the axillary nodes were not palpable and in 42 (70.0%) they were "negative" (Table 3). Accordingly, when the axillary nodes were palpable, they were "positive" in approximately four of every five patients. Conversely when they were not palpable, the nodes were "negative" in almost the same proportion. Therefore, the incidence of error on clinical examination relative to false "positive" and false "negative" nodes approximates 25%.

Skin grafts (split thickness) were applied at the completion of the primary operation in two (2.1%) of the 94 patients. Secondary or delayed grafting was performed in four (4.3%) patients. Wound healing in the remaining 88 (93.8%) patients was by primary intention.

Radiation therapy was not used in any patient as a prophylaxis after operation even though metastases to the axillary nodes were present. Its use was therapeutic and reserved solely for those patients in whom there were local skin, chest wall or regional node recurrences. Chemotherapy was not employed in any patient, either complementary to the operation or for the treatment of recurrent disease.

Bilateral adrenalectomy was performed for recurrent disease in 15 (15.9%) of the 94 patients. The average age was 58.4 years and the interval between mastectomy and adrenalectomy averaged 19.3 months. None of the patients are alive. The average survival time was 10.8 months.

Results of Study

Ninety-three (98.9%) of the 94 patients were available for study. The minimum period of follow-up was 3 years and the maximum 13 years.

Thirty-two (34.4%) patients died of recurrent carcinoma, the average duration of survival being 3 years. One (1.0%) patient was lost to follow-up after 5 years, and although free of disease when last seen, is presumed dead of disease. Fifteen (16.1%)

TABLE 3. *Modified Radical Mastectomy—1958–1968; 94 Patients—Correlation between Size of Axillary Nodes and Presence of Metastases*

	No.	Per Cent
Nodes palpable		
"Positive"	28	82.4
"Negative"	6	17.6
Nodes not palpable		
"Positive"	18	30.0
"Negative"	42	70.0

TABLE 4. *Modified Radical Mastectomy—1958–1968: 3 Yr.–13 Yr. Follow-up—
Prognosis in Relation to Axillary Nodal Metastases*

Axillary Nodes	No.	Avail. for Study	Alive and Well	Alive with Disease	Dead of Disease	Dead of Other Causes
"Positive"	46	45 (97.9%)	9 (20.0%)	2 (4.4%)	24 (53.3%)	10 (12.2%)
"Negative"	48	48 (100.0%)	35 (72.9%)	0 (0.0%)	8 (16.6%)	5 (10.4%)
	94	93 (98.9%)	44* (47.4%)	2** (2.1%)	32*** (34.4%)	15**** (16.1%)

* Average survival: 7.5 yr.
** Average survival: 8.3 yr.
*** Average survival: 3 yr.
**** Average survival: 4 yr. Disease present—one pt.

patients died of other causes and only one (6.6%) had recurrent carcinoma present. The average duration of survival was 4 years (Table 4).

Forty-four (47.4%) patients are alive and well in a follow-up study that averages 7.5 years. Two (2.1%) patients are alive with disease 4 years and 12 years, respectively, after operation (Table 4).

Forty-five (48.3%) of the 93 patients available for study had metastases in the axillary nodes. In the remaining 48 (51.8%) patients the nodes in the axilla were "negative." In the 45 patients with "positive"

nodes only 9 (20.7%) or one in five are alive and well, compared to 35 (72.9%) or approximately three out of four of the 48 patients in whom the nodes were "negative" (Table 4). The results when classified according to the TNM clinical staging system are comparable and are depicted in Table 5.

Seventy-five (80.6%) patients were available for an absolute 5-year survival study. Thirty-seven (49.3%) had "positive" axillary nodes and in the remaining 38 (50.7%) the nodes were "negative" (Table 6). Twenty (32.4%) of the 37 patients with metastases

TABLE 5. *Modified Radical Mastectomy—1958–1968: 3 Yr.–13 Yr. Follow-up—
T N M Clinical Staging in Relation to Survival*

T N M	No.	Avail. for Study	Alive and Well	Alive with Disease	Dead of Disease	Dead of Other Causes
I	60 (63.8%)	60 (100.0%)	37 (61.7%)	1 (1.7%)	16 (26.6%)	6 (10.0%)
II	26 (27.7%)	25 (96.1%)	6 (24.0%)	1 (4.0%)	12 (48.0%)	6 (24.0%)
III	8 (8.5%)	8 (100.0%)	1 (12.5%)	0 (0.0%)	4 (50.0%)	3 (37.5%)
	94	93 (98.9%)	44 (47.4%)	2 (2.1%)	32 (34.4%)	15 (16.1%)

to the axillary nodes survived 5 years. Four (20.0%) of these patients died. Two died of recurrent carcinoma after the sixth year; two died of other causes 7 years and 8 years, respectively; and one patient is alive with disease at the end of 12 years. Seven (18.9%) of the 37 patients with "positive" nodes are alive and well from 5 to 12 years with an average survival of 8 years.

In the 38 patients without metastases to the axillary nodes 31 (81.6%) survived 5 or more years. Two patients died of recurrent carcinoma at 7 years and 7 died of other causes from 6 to 10 years after operation. Twenty-five (65.7%) patients are alive and well from 5 years to 13 years for an average duration of 9 years. The average 5-year survival rate for the total of 75 patients is 57.3%.

An absolute 10-year survival study was done in 37 patients (Table 7). In 18 (48.6%) the axillary nodes were "positive" and in the remaining 19 (51.4%) they were "negative." Three (16.6%) of the patients with "positive" nodes lived 10 years or longer. One is alive with disease over 12 years and 2 (11.0%) are alive and well 11 years and 12 years, respectively.

In the 19 patients without metastases to the axillary nodes 12 (63.1%) lived longer than 10 years. One of these died of other causes and the remaining 11 (57.9%) patients are alive and well from 11 years to 13 years later.

An analysis was made of prognosis in relation to the location of the tumor. In the 16 patients with lesions in the medial half of the breast, three (18.7%) had metastases to the axillary nodes. Ten (62.6%) of the 16 patients are alive and well for an average duration of 7.2 years. In the group of 62 (66.6%) patients with tumors in the lateral half, 32 (61.6%) had "positive" axillary nodes. Twenty-eight (45.2%) of the 62 patients are alive and well for an average duration of 8 years. The tumor was central in location in 16 patients, and in the 15 available for study, the axillary nodes

TABLE 6. *Modified Radical Mastectomy—1958–1971—Absolute 5-Year Survival Rates*

Axillary Nodes	No.	Available for Study	5-Year Survivors	%
"Positive"	37	37 (100.0%)	12	32.4
"Negative"	38	38 (100.0%)	31	81.6
Total	75	75	43*	57.3

* 4 pts. (5.3%) died of disease; 1 pt. (1.3%) alive with disease 12 yr. p.o.

were "positive" in 10 (66.6%) and "negative" in five (33.3%). Six (40.0%) of the 15 patients are alive and well for an average survival of 6 years.

The prognosis in relation to age groups from 40 to 59 years compared to those from 60 to 79 years is shown in Table 8. In those patients who died of disease the average survival was 32.3 months in the younger group compared to 40.6 months in the older. The one patient in the younger age group who died of other causes lived one year. In the older age group the average survival of the 13 patients who died of other causes was 50.9 months. There were more patients in the younger age group who were living and well, but, as one might expect, more of these patients died of disease. Also there would be a greater likelihood for patients in the older age group to die of other causes as indeed occurred in this study.

TABLE 7. *Modified Radical Mastectomy—1958–1971—Absolute 10-year Survival Rates*

Axillary Nodes	No.	Available for Study	10-Year Survivors	%
"Positive"	18	18	3	16.1
"Negative"	19	19	12	63.6
Total	37	37	15	40.5

TABLE 8. *Modified Radical Mastectomy—Prognosis in Relation to Age Group*

		Alive and Well	Alive with Disease	Dead of Disease	Dead of Other Causes
40-59	45*	23 (51.2%)	2 (4.4%)	19 (42.2%)	1 (2.2%)
60-79	46**	20 (43.4%)	0 (0.0%)	13 (28.3%)	13 (28.5%)
Total	91	43	2	32	14

* Nodes + : 25 pts. 15 (60.0%) died of disease.

Nodes - : 20 pts. 4 (30.0%) died of disease.

** Nodes + : 20 pts. 9 (45.0%) died of disease.

Nodes - : 26 pts. 4 (15.3%) died of disease.

Discussion

Before discussion of the clinical study presented, it is believed important to re-emphasize the fact that none of the patients received prophylactic radiation therapy, regardless of the presence or absence of metastases to the axillary nodes. It was used only for the treatment of recurrences and was required in but 9 (9.5%) patients (Table 5). The location of the regional nodes recurrences is depicted in Table 12. Furthermore, none of the patients had prophylactic oophorectomy. The decision not to use either of these ancillary treatments was empirical. Recently, however, this decision was supported in fact by the excel-

lent randomized controlled study of the National Surgical Adjuvant Breast Study headed by Fisher.⁸ The results of this study showed that neither radiation therapy nor oophorectomy, used prophylactically, had any salutary effect on the long-term survival rates in the surgical management of patients with breast cancer.

A major objection to the modified radical mastectomy is that a complete axillary dissection cannot be done. However, this objection is not substantiated by clinical fact. Repeatedly, by lymphangiographic studies (Figs. 1, 2, and 3), the ability to "clean the axilla" has been documented. Patey²³ advocated removal of the pectoralis minor muscle to facilitate the dissec-

TABLE 9. *Comparative Study—Modified and Standard Radical Mastectomy—Survival Rates and Local Recurrences*

Operation	% 5-Yr. Surv.		% 10-Yr. Surv.		Local Recurrence (% in 10 Yr.)
	Nodes —	Nodes +	Nodes —	Nodes +	
Modified radical					
Handley, Thackray (Patey's oper.)	75	57	61	25	20
Author's series	82	32	63	17	10
Standard radical					
Haagensen, Cooley	85	59	70	40	10
Butcher	76	48	56	30	—
Cáceres	74	47	65	31	10

TABLE 10. *Comparative Study—Modified and Extended Radical Mastectomy—Survival Rates and Local Recurrences*

Operation	% 5-Yr. Surv.		% 10-Yr. Surv.		Local Recurrence (% in 10 Yr.)
	Nodes —	Nodes +	Nodes —	Nodes +	
Modified radical					
Handley, Thackray (Patey's Oper.)	75	57	61	25	20
Author's series	82	32	63	17	10
Extended radical					
Dahl-Iversen	78	46	59	21	24
Cáceres	83	44	67	25	10
Urban	84	72	63	60	3

tion of the axilla which we did not find necessary. The main reason for removal of this muscle is on the basis of destruction of its nerve and blood supply. Admittedly, if such are destroyed, the muscle is useless and should be removed. However, in the technic of operation previously described,¹⁸ the neurovascular supply to the pectoralis minor muscle is preserved and its sacrifice is not practiced.

The necessity to dissect completely the axillary contents is questioned by Auchincloss.¹ In his study, if the apical nodes were invaded, the value of their removal was questioned. In 38 patients who had metastases to the apical nodes, only four (10.5%) have remained free of disease in a follow-up study of 8 to 10 years. Conversely, when the apical nodes are not "negative" the extension of the axillary dissection is not required since equally satisfactory results are obtained with excision of the lower chain of nodes in conjunction with removal of the breast and preservation of the pectoral muscles. Furthermore, Crile⁵ has accumulated intriguing data to support the concept that in operative Stage I* cancer of the breast, dissection of the axillary nodes should be delayed and performed subse-

quently only if there were nodal metastases. Experimental data were presented to indicate that the excision of normal regional lymph nodes may remove a natural protective immunologic barrier to the systemic spread of the primary tumor. The clinical fact that the survival rates following delayed axillary dissection were equal to or better than those following prophylactic node dissection with removal of the breast lends credence to this contention.

A second objection to the preservation of the pectoral muscles is that the interpectoral lymphatic chain (Rotter) may be the site of recurrent disease. Admittedly, metastases to these nodes has been documented by many authors. However, in the consecutive series of 93 patients presented,

TABLE 11. *Modified Radical Mastectomy—1958–1968: 3 Yr.–13 Yr. Follow-up—Radiotherapy*

	No. of Patients	Alive
Prophylactic	0	
Therapeutic	9*(9.5%)	1**(11.1%)
Local skin recurrence	3	
Osseous metastases	2	
Regional nodal metastases	6	

* Two patients had both regional nodal and osseous metastases.

** 12 mo. Regional nodal metastases.

* No axillary involvement is palpable at operation.

TABLE 12. *Modified and Classical Radical Mastectomy—Postoperative Regional Node Metastases—Comparative Study*

Type of Mastectomy	Avail. for Study	No.	Axillary Nodes		Supraclavicular Nodes	
			Ipsilat.	Contralat.	Ipsilat.	Contralat.
Modified	93	9* (9.1%)	2	2	7	1
Classical	44	8** (18.1%)	5	1	4	1
	—	—	—	—	—	—
	137	17*** (12.4%)	7	3	11	2

* Contralateral axillary, contralateral and ipsilateral supraclavicular—one pt.

Ipsilateral supraclavicular and contralateral axillary—one pt.

** Ipsilateral and contralateral axillary—one pt.

Ipsilateral and contralateral supraclavicular—one pt.

Ipsilateral supraclavicular and ipsilateral axillary—one pt.

*** Multiple recurrences in five (29.4% patients).

invasion of the interpectoral lymphatics, either at the time of operation when biopsy excision is routine, or as a postoperative recurrence, has not been observed. Also the absence of muscle invasion by recurrent tumor has been a noteworthy feature of the operation which has been commented upon by various authors.^{61, 22, 23} None of the patients in this series had recurrent disease in the muscles.

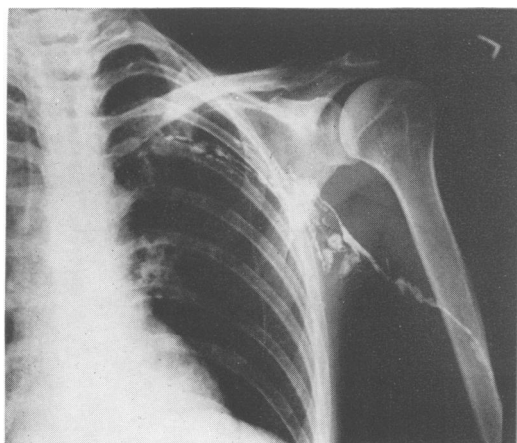


FIG. 1. Preoperative lymphangiogram, showing distribution of lymphatics in proximal portion of the left arm and axilla.

The proper evaluation of the merits of the modified radical mastectomy would be to compare the results of its use with those obtained with either the standard or extended radical operation. Unfortunately in most of the series reported, the patient groups are heterogenous and the sampling volumes are too small for the accumulation of accurate comparative data. However, those data which have been obtained are indicative of a trend and do give support to the relative merits of the modified radical operation.

A comparative study of the modified and standard radical mastectomy is shown in Table 9. The differences in survival rates, however, are not of statistical significance and do not indicate a superiority of the standard radical procedure. In our own series there were apparent lower 5- and 10-year survival rates in patients with metastases to the axillary nodes. However, it must be emphasized that the series of 93 patients reported was consecutive and unselected as indicated by the number of patients in Stage III of the TNM classification (Table 5). Accordingly, the operation was performed on some patients who would

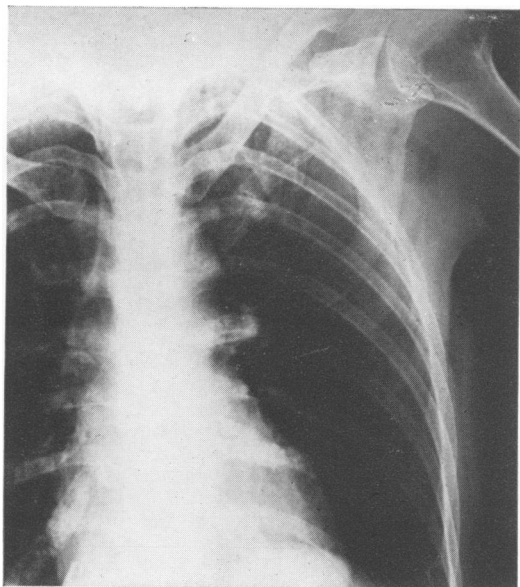


FIG. 2. Immediate postoperative roentgenogram of the chest to show that the dye filled axillary lymphatics have been completely removed.

have been denied operation had more select criteria been employed. Also, since the sampling volume is small, the factor of chance cannot be eliminated.

Finney,⁷ in a follow-up study of 280 patients who had the standard radical operation, reported a 5-year survival rate of 49% and a 10-year survival rate of 19%. Harrington¹⁵ studied the results obtained in 6,149 patients who had the standard radical mastectomies. Sixty-five per cent of these patients had metastases to the axillary nodes. The 5- and 10-year survival rates in this group of patients were 30.4% and 16.4%, respectively. None of these supplementary data indicate a superiority of the standard over the modified radical mastectomy.

In a comparison of the modified and extended radical operation (Table 10) the data, with the exception of Urban's²⁶ report which is unparalleled, do not indicate that the extension of the operation is associated with improved long-term survival rates. Furthermore, it is believed of inter-

est that both Caceres⁴ and Dahl-Iversen⁶ have discontinued the routine use of the extended radical mastectomy.

The correct operation for the treatment of cancer of the breast is unknown. In those patients with concomitant metastases to the axillary nodes, the superiority of any one operative procedure is doubtful. Conversely, when the axillary nodes are "negative," the simpler operations are apparently just as good as the more radical procedures. In fact, in some patients segmental resection of the breast may prove to be the method of choice. This procedure has been used in two patients with clinical Stage I lesions on a highly selective basis.

From the results of the clinical study presented, the modified radical mastectomy with the preservation of both pectoral muscles is believed equally as satisfactory as either the standard or extended radical operation in the treatment of cancer of the breast.



FIG. 3. Photograph of the resected specimen with the dye filled axillary lymphatics.

Conclusions

In the surgical management of cancer of the breast, the modified radical mastectomy, in which both of the pectoral muscles are preserved, is as satisfactory as either the standard or extended radical operation.

The use of radiation therapy as a prophylaxis after operation in patients with metastases to the axillary nodes is not recommended. Its use is limited to the treatment of cutaneous, localized osseous or regional nodal recurrences.

Extensive prospective, randomized, and controlled studies are required to determine the relative efficacy of the simple mastectomy and the varied types of radical mastectomy in the treatment of breast cancer.

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